
ABSTRACT

A method for producing compound semiconductor quantum particles from at least a metallic element selected from Groups IB, IIA, IIB, IIIA, IVA, and VA of the Periodic Table and at least a non-oxygen reactant element selected from the group consisting of P, As, S, Se, and Te.

The method includes the steps of: (a) mixing a first precursor composition containing at least a metallic element with a second precursor composition containing at least a reactant element to form a reacting fluid in which nanometer-size compound semiconductor clusters are precipitated out of a liquid medium; (b) operating an atomizer to a break up the reacting fluid into micron- or nanometer-size fluid droplets with each fluid droplet containing a predetermined, but small number of nanometer-size compound semiconductor clusters dispersed in the liquid medium for the purpose of constraining the growth of the clusters; (c) directing the fluid droplets into a material treatment stage to further separate and/or passivate the clusters to form the desired compound semiconductor quantum particles; and (d) drying and collecting the quantum particles in a solid powder form.